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FM 31-10

WAR DEPARTMENT

BASIC FIELD MANUAL

&

COAST DEFENSE

July 12, 1941

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COAST DEFENSE

Prepared under direction of the
Chief of Staff

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WAR DEPARTMENT,
WASHINGTON, *July 12, 1941.*

FM 31-10, Coast Defense, is published for the information and guidance of all concerned.

Operations involving the joint action of the Army and the Navy are governed by special regulations. The scope of this manual is limited to those coast defense doctrines and operations which should be familiar to all officers of the Army.

Coast defense, in its broadest sense, includes all measures taken to provide protection against any form of attack at or near the shore line as well as within the combat zone immediately in rear thereof.

In the preparation for and the execution of coast defense, the basic consideration for the defending force is the defeat and destruction of the invading force before it lands or while it is attempting to gain a foothold on the beach. Prompt, decisive action must characterize the conduct of the defense. To delay immediate positive, aggressive action in the expectation of launching counteraction by stronger forces which are assembled after the enemy has secured a foothold or beachhead fails to take advantage of the period of time when the attacker is weakest (while in landing boats and when debarking from these boats or while attempting to effect a landing from airplanes).

This manual should be studied in conjunction with FM 100-5 and FM 31-5.

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(For explanation of symbols, see FM 21-6.)

TABLE OF CONTENTS

		Paragraphs	Page
SECTION	I. Armed forces in coast defense	1–6	1
	II. Army mobile forces in coast defense	7–34	4
	III Plans and preparations for use of mobile forces.	35–58	12
	IV. Tactical disposition and function of combat elements	59–119	22
APPENDIX.	Glossary		40
INDEX			45

RESTRICTED

BASIC FIELD MANUAL

COAST DEFENSE

SECTION I

ARMED FORCES IN COAST DEFENSE

1. In coast defense, the general mission of the armed forces is to prevent or repel a landing by hostile forces on United States soil or in any theater of operations designated by the President.

2. The *fleet* must act offensively. It requires secure bases from which to operate, but must be freed from the necessity of protecting these bases. The Army, assisted by naval local defense forces, furnishes this protection against naval, air, and land attacks. For these purposes, harbor defense forces are reinforced as required.

3. Navy *offshore* and *inshore* patrols are a source of valuable information to Army commanders. The information secured by these patrols and by the reconnaissance agencies available to the commanders of Army ground forces provides a basis for the suitable disposition of the ground forces to meet possible hostile landing attempts.

An *offshore patrol* operates in the outer part of the coastal zone (the whole area of the navigable waters adjacent to the seacoast and extending seaward to cover the coastwise sea lanes and focal points of shipping). It may be composed of destroyers, submarines, mine sweepers, gunboats, eagle boats, yachts, or similar vessels, aircraft tenders, and aircraft. When the coast is seriously threatened the offshore patrol provides a number of screens:

a. Naval aviation operating from shore bases is employed to obtain early information of the approach of a hostile force.

b. Less distant from shore than the line reached by aviation, a submarine patrol constitutes the outer line of observation during darkness and in weather unsuitable for air operations.

c. Closer to shore than the submarine patrols, a screen of destroyers and small vessels is maintained for the purpose of attacking enemy submarines that may precede the main hostile force. This screen also serves as a third line of observation.

Ordinarily, information from the offshore patrol is sent to naval district headquarters, and thence to higher Army headquarters.

An *inshore* patrol of small and less seaworthy vessels operates in close cooperation with the forward elements of the Army defense forces. The principal missions of the inshore patrol are to form a floating outpost line of observation for the Army, to protect and control shipping in the inner part of the coastal zone, and to assist in the protection and maintenance of obstacles. Arrangements are made with the Navy to provide for the transmission of information direct to advanced Army elements.

It is of the utmost importance that the land forces be provided promptly with the information gained by naval agencies of the hostile forces at sea. To facilitate the rapid transmittal of this information joint message centers are established, Army liaison officers are maintained at naval signal communication centers and the headquarters of the land forces may receive messages direct from the offshore patrol, using, for this purpose, naval frequencies and codes.

■ 4. The primary mission of the *Army mobile forces* is to meet and defeat enemy landing forces at or near the beach, including air landing and parachute troops.

■ 5. The *Army Air Forces* constitute an important element in coast defense. Their operations alone or in conjunction with naval air and surface craft may prove decisive.

The initial effort of the defense may be to prevent or delay the enemy's obtaining bases suitable for the employment of his air power. Where these bases are few and easily defended, it may be advantageous for the defender to seize and hold them for his own use or to deny them to the enemy. The Army Air Forces operate to support the local defending forces or to attack enemy forces attempting to establish bases at undefended points.

If the enemy is successful in establishing bases suitable for the employment of his air power, the Air Force Combat Command may operate to neutralize enemy bases or its strength may be conserved to assure adequate power for the defense at a later time.

The Air Force Combat Command is employed against a hostile expeditionary force beginning at the time best calculated to produce effective results, either alone or in conjunction with other elements of the defense. If it appears that successful defense will ultimately depend upon the combined efforts of all available land, sea, and air forces, premature or piecemeal engagements are avoided. However, consideration is given to the cumulative effect of prolonged repeated successful air attacks, delivered at the greatest practicable distance from the area defended.

The primary objectives of air attacks are the more important elements of the hostile expeditionary force. Initially, these may be airplane carriers or vessels seeking to land forces for the capture of outlying bases and these bases themselves. (See FM 1-5.)

Upon the approach of a hostile convoy, the destruction of transports has first priority. Transports may be most vulnerable during the debarkation of troops.

During landing operations, transports, small boats, and enemy concentrations on the beaches are principal objectives. During this period of the operation, the Air Force Combat Command constitutes a powerful means by which the commander is able to influence the action where practicable. Counterattacks should be strongly supported by combat aviation.

Subsequent employment of the Air Force Combat Command depends upon the missions of the combined arms. If the landing is repulsed, every effort is made to complete the destruction of the hostile force.

In all operations unity of effort is sought. The employment of Army air forces is closely coordinated with all naval forces. (See par. 39.)

■ 6. The mobile forces of the Army are responsible for beach or land defense of the entire coast, including the areas within *harbor defenses.* Harbor defenses provide a seaward defense of water areas which, in general, include the best and most

direct approaches to good harbors and important objectives. *Temporary* harbor defenses are organized from available mobile artillery, to provide a seaward defense of important water area not protected by permanent harbor defenses. Both permanent and temporary harbor defenses operate under control of the commander of the sector or subsector in which they are located.

Harbor defenses constitute strong points in the defense of the coast. By defending important harbors and coastal areas, they compel the attacker to resort to the difficult task of disembarking troops, equipment, and supplies on open beaches and of undertaking time-consuming land operations for the capture of these harbors and coastal areas.

SECTION II

ARMY MOBILE FORCES IN COAST DEFENSE

■ 7. The *basic doctrine* of successful coast defense is to defeat the enemy prior to landing or while he is attempting to land. Should he gain a foothold all available means are employed to eject him and drive him back into the water where his destruction is completed.

■ 8. During *peace,* continuing reconnaissance and study are required to evolve and prepare plans to meet possible hostile lines of action against the continental United States, oversea possessions, and island bases. The training of the armed forces in coast defense operations during peace has the dual purpose of developing a fighting force highly efficient in such operations and the testing of prepared plans. Construction of fortifications, both fixed and field, for the protection of important areas and favorable landing beaches is of major importance. To delay this construction until an attack is imminent may result in early defeat of the defending forces.

■ 9. From the time that diplomatic relations with one or more potential enemies become strained until an attack is launched against the coast, the preparation for and execution of the defense passes through three stages:

a. Intensified reconnaissance and preparation.

b. Position in readiness.

c. Resistance.

INTENSIFIED RECONNAISSANCE AND PREPARATION

10. Agents of the various intelligence services seek especially for evidences of an oversea expedition by the enemy. His capabilities are estimated. In this estimate special consideration is given to the water distance he must travel, the shipping he has available, the strength of his navy and air force, the training, organization, and equipment of his troops for landing operations, the initial operations he may undertake to seize bases close to our shores, and the assistance he may receive from agents in areas of his possible objectives and from other powers. As necessary, war plans are revised to meet changed conditions.

11. During this period, *sector* and *subsector* commanders may be designated. These commanders are provided as a minimum with suitable staffs and detachments of engineer, Signal Corps, and other troops necessary for detailed reconnaissances and preliminary preparations. Each subsector commander is furnished the following information and instructions:

Probable strength, composition, and location of sector reserves, and location of the sector command post.

Location of subsector boundaries and command posts.

Probable strength and composition of forces to be assigned the subsector.

Probable time subsector troops will become available to the subsector commander and the number, kind, and dates of availability of weapons to augment those organically with the troops allotted.

Authority to hire necessary civilian labor and to requisition necessary commercial equipment, transportation, signal communication facilities, and supplies of all classes from local sources.

12. The missions of sector and subsector commanders and advance detachments are to—

a. Familiarize themselves by personal reconnaissance with local topographical, hydrographical, and meteorological conditions and existing defense plans and projects for the sector and subsector.

b. Establish relations for cooperation with local civil and naval officials.

c. Recommended revisions in existing plans and projects as appear necessary or advisable.

d. Make arrangements for the local hiring of civilian labor and commercial equipment and the requisitioning of commercial transportation, signal communication facilities, and supplies of all classes necessary to accomplish the plan and projects as approved by higher authority.

e. Initiate construction of new or additional defensive works to meet the defense requirements.

f. Formulate plans and arrange for the reception, allocation, and training of incoming troops.

g. Initiate counterintelligence measures.

h. Secure the aid of pertinent civil agencies in establishing an aircraft warning service, where such service has not been established by other agencies.

i. Make provision for the aid of civil defense agencies in combating troops transported by air and in extinguishing fires.

■ 13. In locating defensive positions for each probable landing area, personal reconnaissance of the ground by subsector commanders is essential. In determining the specific locations of organized tactical localities or defensive positions near the shore line, the subsector commander, accompanied by the senior local naval commander, makes detailed personal reconnaissance of the entire beach, as well as reconnaissances by sea and by air.

■ 14. To protect important civilian and military establishments and installations against sabotage and raids, security detachments are provided to guard such features as airdromes, cable huts, radio stations, mine casemates, range stations searchlights, water, electric, and gas systems, locks, dams and fortifications not within the harbor defense system. Not only during, but prior to, the outbreak of hostilities special precautions must be taken to guard against depredations and preliminary attacks by troops transported by air.

■ 15. When developments indicate that a joint oversea operation against the coast is probable, forces are allocated to the various sectors for defense. Within each sector, the sector commander may hold these forces concentrated in one or more large groups to facilitate training and supply and to

assist in gaining secrecy as to future dispositions. He may reinforce harbor defenses with mobile artillery or other troops. It is essential that appropriate transportation be provided for the rapid movement of troops to repel landing attempts.

16. As an aid in training, commanders and staffs participate in war games and command post exercises in which situations are based on plans of defense for the particular area to which they are assigned. All unit commanders and their staffs make reconnaissance of beach positions and supporting positions to which their units may be required to move. They make thorough reconnaissances, both during daylight and darkness, of all roads and trails in their probable areas of operations. Plans are also prepared and tested to provide for traffic control so that columns may move expeditiously even under the most adverse conditions.

POSITION IN READINESS

17. From the time that a definite threat of attack against the coast develops until the enemy's forces arrive within striking distance is a period during which the defending forces are disposed in a position of readiness to repel the hostile attack. (See par. 15.)

18. During this period it must be expected that the enemy will conduct some or all of the following operations:

Intense naval and air reconnaissance.

Landing operations to establish air bases on islands or on undefended portions of the mainland.

Air operations to gain superiority of the air.

Destruction, driving in, or containing naval patrol forces; mine-laying and mine-sweeping operations.

Air and naval bombardment.

Sabotage of important establishments and routes of communication.

Employment of parachute troops and air landing troops to seize and destroy important installations.

19. To increase the readiness of the defender to meet and repel an attack, units allocated to sector reserve move to the positions assigned in the plan of defense. Units allocated to subsectors move to their respective subsectors. The bulk of the troops in each subsector is held in one or more groups

well back from the shore line, in positions which facilitate prompt movement to possible landing areas. These troops are provided with motor transportation. Small outpost detachments are sent forward to the beaches and critical areas of the shore line to observe and patrol. These detachments must be provided with adequate means of rapid signal communication. (See par. 53.)

During this period naval local defense forces and aviation of the defending forces increase their activity to gain and maintain contact with the hostile forces at sea. Bombardment aviation may be employed to neutralize hostile bases and assembled matériel within range. (See also par. 5.)

■ 20. As soon as troops arrive in the subsector, intensive joint training for all Army and Navy defensive units is initiated. Personal reconnaissance of the terrain is made by all commanders. Units are trained to move rapidly to defend threatened areas by day or night. Field fortifications are improved and augmented. Water and land obstacles and prepared demolitions are improved and increased. (See also pars. 46 to 52.) Security, signal communication, and alarm systems are tested and perfected.

RESISTANCE

■ 21. As the hostile oversea expedition comes within striking distance of the coast, the attacker will endeavor to deceive the defender as to the area in which he will make his major effort. Movement on a broad front, changes in direction of movement of convoys, feints, secondary landings, and employment of parachute and air landing troops must be expected. However, to launch his major effort he will necessarily concentrate a large proportion of his force in a definite water area and will sacrifice much of his mobility.

■ 22. The defender must be prepared to meet effectively any hostile action. As the enemy force approaches the coast, outpost forces are progressively reinforced in front of the major hostile movements. Based on an estimate of enemy capabilities, higher commanders indicate where the concentration of effort is to be made by subordinate commanders with the forces initially available to them and with reinforcing elements allotted from reserves initially retained by the

higher commander. As the enemy reduces his maneuverability at sea by concentrating his forces for attack, the defender progressively concentrates his forces. This concentration may involve no movement of general reserves. It may require changes in missions and an increase of forces allotted to subordinates in the threatened areas. Since the enemy has freedom of movement until he launches his attack in landing boats, the location of the defending forces and the allotment of means to subordinates must permit rapid changes in dispositions to meet hostile developments. Holding a coast line in such force as to leave insufficient reserves available to meet the major hostile effort destroys the flexibility of the defense and exposes the defending force to decisive defeat as soon as the line of defense has been pierced.

■ 23. When attacked, each subordinate commander must resist all landing attempts. Every effort must be made to determine the enemy main attack. Every facility of ground and air observation must be employed to gain information about the location of the bulk of the enemy transports and the density of the landing boats directed toward each possible landing area.

■ 24. The period from the time the enemy moves toward the shore in landing boats until the attack is beaten off is the most critical time for the commander. Hostile local air superiority will probably deprive him of much valuable information; he will receive false or misleading information. A major asset is a well-trained force, thoroughly familiar with its task, the terrain of its operations, the mission it must accomplish, and indoctrinated with the idea that the enemy must not be allowed to gain a foothold on shore.

■ 25. The major landing attack having been determined, general *reserves* are promptly and decisively moved to defeat this attack and drive the enemy into the water.

■ 26. Several important factors must be borne in mind in *planning*, *preparing*, and *executing* the defense against an attempted or probable landing:

Until the attacker commits his troops to a landing in a definite area, he retains the initiative and the advantage of

superior mobility. This mobility facilitates surprise and the concentration of superior forces at the area selected for his main effort.

The period of greatest weakness to the attacking forces is while they are in small boats approaching the shore, and from the time they come within range of the defender's fire until they are beaten off or effect a landing. The transfer of units from transports to shore and their assembly on shore is a difficult and time-consuming operation. The defender must utilize this time to his maximum advantage.

■ 27. For the successful defense of a coast line the defender provides for *outposts* (see pars. 62 to 64) at each practicable landing beach and the location of mobile reserves in areas which will permit their rapid employment at critical areas to reinforce the outposts when the beach destination of the enemy attack is determined. The mission of the outpost is to observe and gain timely information of the strength, movement, and actions of the enemy force, and to oppose and delay landing operations. (See par. 61.)

■ 28. *Subsector* and *sector reserves* should be fully motorized. They are disposed on good routes of communication so that they may move quickly to beaches in the subsector or sector that is attacked. For this purpose it may be necessary to dispose the subsector or sector reserve into two or more groups. (See pars. 75 and 76.)

■ 29. *General reserves* are so located that reinforcement of any beach under attack can be quickly effected. These reserves must be motorized. (See par. 77.)

■ 30. The primary mission of units sent to reinforce the outposts is the disorganization and destruction of the attacking elements, so as to prevent the enemy gaining and consolidating a foothold on shore. As reinforcing elements arrive at the beach they are employed immediately to occupy previously reconnoitered positions and augment the fire of the outpost or to attack and drive into the water the hostile forces which have landed. Counterattacks must be launched on the initiative of local commanders. To delay awaiting further information or reinforcements transfers the advantage of time to the attacker.

31. It must be expected that hostile combat aviation will attack reserves in movement, and defiles and critical areas along routes of movement. Careful reconnaissance and planning, and thorough training are required to reduce to the minimum delays from such attacks. Provision must be made for protecting the movement with all available suitable ground weapons and combat aviation.

32. Should the enemy succeed in establishing himself on shore, the conduct of operations is executed in accordance with the doctrines enunciated in FM 100-5. A strong coordinated counterattack, supported by all available combat aviation and armored units and launched while the enemy is endeavoring to augment his initial success will often prove decisive in ejecting the landing force.

33. An enemy may be unable to undertake major landing operations but he may attempt minor operations to affect morale, gain information, or temporarily occupy or destroy important objectives. Such attacks may be made without the attacker having control of the sea. Harbor defense installations, coastal cities, naval bases, and similar establishments constitute probable objectives for minor attacks. It must be expected that troops transported by air and troops put ashore at beaches within easy striking distance of the objective will be employed and that enemy agents and sympathizers will attempt to assist the enemy troops. To meet effectively an attack of this kind, the necessary troops should be assigned permanently to the defense of these areas. Time will ordinarily not be available for the movement of distant reserves to meet the hostile attack. Observation posts and beach and boat patrols are maintained in the danger areas. Beach defenses are organized.

34. The defense of *oversea possessions* is organized and conducted in accordance with approved defense plans. All plans must be based on the capabilities of the permanent garrison and such reinforcements as are provided by War Department plans and which arrive prior to hostile attack. Their isolated position will probably preclude the arrival of reinforcements except by air, during an attack.

SECTION III

PLANS AND PREPARATIONS FOR USE OF MOBILE FORCES

■ 35. An analysis of the geographical and physical features and meteorological conditions of coastal areas precedes the development of plans for their defense.

This analysis enables commanders to determine critical terrain areas, to estimate probable major and minor objectives of an enemy force and probable landing areas, to evaluate possible lines of enemy action, and to calculate the influence of time and space on various defensive dispositions.

■ 36. Detailed studies of the principal water and land areas are necessary.

For water areas it is important that complete information be obtained as to the hydrographic characteristics of exterior water areas to include deep and shallow waters, reefs and shoals, rise and fall of tides, channels, and beach approaches; and of interior water areas to include straits, passes, inlets, bays, sounds, harbors, rivers, bayous, canals, and lakes.

Land areas and establishments of which detailed information must be obtained include shore lines; mountain ranges; hill masses; wooded and open areas; swamps; plains; plateaus; railways; highways; defiles; airways and landing fields; cities and towns to include railroad yardage capacities, water-to-rail facilities, and systems of gas, water, and electric power supply; military and naval reservations, establishments, and utilities; important industrial regions; ferry lines; commercial, military, and naval telephone, telegraph, and radio systems; fuel storage centers; local commercial shipping available; harbor defenses

■ 37. The climatic conditions; storm periods; wet and dry periods; prevalence of fog, mist, and haze; prevailing winds of different seasonal periods; and prevalence of excessive heat or ice and snow require special study since they will ordinarily affect the time and place of enemy major action and consequently must be carefully considered in defense plans.

■ 38. In preparing plans and disposing elements for coast defense the defender must consider the possible operation

from both points of view. To the attacker, landing areas are most suitable as they possess in the greatest degree the following characteristics: freedom from hostile opposition; inability of the defender to concentrate troops opposite each possible beach as compared with the attacker's ability to concentrate where he desires; absence of permanent means of defense or obstacles; freedom from peninsulas, points, or small islands which make enfilade fire possible to the defenders; freedom from commanding ground advantageous to the defender for observation and fire control; access to terrain for future operations if the landing is successful; suitable number and location of beaches and favorable tidal conditions; absence of defiles, marshes, and other obstructions near the shore; slopes at the shore line which will permit the beaching of boats; absence of reefs and similar obstructions between the transport area and the shore; and water deep enough to permit naval vessels to provide effective fire support.

■ 39. To facilitate the preparation of defense plans in joint operations, the following territorial subdivisions usually are organized:

a. Defense commands.

b. Sectors within defense commands.

c. Subsectors within sectors.

d. Local (or unit) sectors within subsectors.

The *defense command* is a territorial agency, within the continental United States, with appropriate staff designated to coordinate or prepare and to initiate the execution of all plans for the employment of Army forces and installations in defense against enemy action in that portion of the United States lying within the command boundaries.

The commander of the defense command is responsible for the local coordination of plans for the employment of Army forces with such plans of naval units. He is responsible in war for the execution of all defense operations unless otherwise directed by the War Department.

Pursuant to pertinent color plans, the commanding general, defense command, will prepare complete defense plans. Such plans will include an air annex prepared by or under the direction of the Chief of the Army Air Forces, and approved by the commanding general, defense command.

In the execution of any particular plan, units of the Army Air Forces will be attached, as necessary, to the defense command, by the War Department. The commander of the attached units and installations of the Army Air Forces becomes an immediate subordinate of the commanding general, defense command. The attachment of the Army Air Forces to defense commands, or support of defense commands by such units, may be only temporary.

Organization of *sectors* into *subsectors*, and of *subsectors* into *local* (*or unit*) sectors, is determined primarily by the following considerations: width of front to be defended; number, importance, and location of probable enemy major and minor objectives; number, importance, extent, and location of practicable landing areas; physical geographic features; railway and highway nets; location and strength of permanent harbor defenses; troops and armament estimated to become available for allocation to the sector; available command and administrative facilities; and signal communication net.

The mission assigned to a subsector or local sector commander will depend, in part, on the strength and composition of forces assigned to the subsector or local sector, and the number, importance, and extent of the localities to be organized for defense. All commanders are given the mission to organize and defend their respective areas. Should the enemy succeed in establishing himself ashore, local commanders must exert every effort to block or delay further advance, pending the arrival of reinforcing units.

■ 40. On every extensive coast line there are sections where landings are unlikely because of hydrographic, terrain, or other conditions. Since these sections involve risks to the attacker out of proportion to possible advantages, the defender need only keep them under observation. However, it must be borne in mind constantly that the commander cannot rely on even the worst terrain as a defense in itself. He must be prepared to meet and defeat an attempted landing in any area. There are other sections where landings are possible, but improbable because of the nature of the terrain —such as rocky, abrupt shore lines and difficult defiles—the

absence of road and railroad nets, or the presence of permanent defenses. These sections are kept under observation and countermeasures are planned for opposing possible landings. Still other sections exist, where landings are not only possible but probable. Troops and other agencies of defense are allocated for defending all such sections of the coast. In all defense measures provision must be made to defeat attacks made by troops transported by air.

■ 41. The initial allocation of mobile troops to subsectors or local sectors which have practicable landing areas close to probable major objectives will be greater than for similar sections of the coast more distant from such objectives. The defender must correctly determine these more important objectives and be prepared to shift his forces to meet the enemy in force before he can become established on shore. The location of defending troops, to include general reserves, must be based on a careful estimate of the situation, with special consideration of the time required to move to various areas. *In any situation, the enemy is resisted with ever increasing strength wherever he may attempt a landing in force.*

■ 42. Two important factors favor the defense: first, to be successful the enemy not only must get ashore, but must establish himself so that his ship-to-shore movements are comparatively free of fire; and second, he must obtain enough maneuver room to avoid the necessity for purely frontal attacks. Superior mobility on land, observation, and ammunition supply of the defender offset, to a considerable degree, the superiority in numbers and armament of the attacker. The most determined effort must be made to destroy the hostile landing waves before they can gain a lodgment on the shore. To anticipate possible failure in defeating the enemy at the beach, the defensive arrangements should insure stabilization until general reserves can intervene.

■ 43. All defensive positions selected are thoroughly organized for defense. They are prepared to resist attacks directed against their flanks and rear, especially by mechanized units and troops transported by air. (See FM 100-5.)

Routes leading to all defensive positions and defense areas are carefully reconnoitered. Plans are prepared and tested to assure proper traffic circulation and control. Preference is given to the employment of guides rather than directional signs.

The priorities listed below give the relative emphasis placed on tasks; they do not necessarily indicate the time order in which the various works are to be executed. Ordinarily, work will be carried out simultaneously on all portions of the defense area. The extent and difficulty of the ground organization required and the time available will determine the allocation of means and personnel for the various tasks. Obstacles, including underwater obstacles opposite beaches, demolitions, and camouflage, constitute major tasks in each priority. (See pars. 46 to 52.)

The *first priority* in organization of the ground is the *first defensive position.* This position consists of a series of defense areas (battalion, company, or platoon), generally parallel to the shore line where landings are likely, and so situated that the defender can place effective machine-gun fire *on* and *in front of* the beach and on intervening terrain. These defense areas must not be so close to the beach that they can be quickly overrun by the first landing wave which succeeds in gaining a foothold on the shore. The defense areas are sited so that they block direct advance from the beach, include features which block or flank natural avenues of approach and facilitate flanking action against an enemy advance, and provide protection to artillery observation of the beach. In selecting the defense areas, consideration is also given to the facility with which they can be reached by reinforcing units. The first defensive position is supported by defensive positions in rear (see below), by the intervention of reserves, by normal artillery barrages at and beyond the water's edge, and by available combat aviation.

The *second priority* in organization of the ground is the *line of observation posts and rifle, automatic weapon, and antitank gun emplacements along the beach.* Splinter-proof protection is the minimum requirement for these emplacements. Positions for reinforcing units are organized to the extent possible by the time and labor available. (See par. 61.) The emplacements are concealed or camouflaged to prevent detec-

tion prior to the time fire is opened from them. They are provided with small slit embrasures in sufficient number to permit frontal and flanking fire and fire to the rear. The weapons are sited so as to provide continuous bands of small arms fire in front of the beach and to prevent troops which may succeed in landing from extending their flanks along the beach. Low silhouette, turret top pill boxes, constructed of reinforced concrete or steel and erected in the water at a suitable distance from the shore line, will provide advanced islands of resistance from which grazing fires can be effectively brought to bear on troops moving to the shore in boats. These pill boxes provide a fixed source of fire power whose location makes attack by enemy troops extremely difficult.

The *third priority* in ground organization is a *second defensive position* located in rear of the first defensive position (first priority). The second position must be located within effective light artillery range of the landing beaches. It is sited to limit landing operations and maneuver of the enemy, to protect the withdrawal of troops from the first and intervening positions (see below), if withdrawal of these troops becomes imperative, and to facilitate the launching of counterattacks by reserves. Should the enemy succeed in advancing to this position, the defender must exert every effort to stop him. Otherwise, the landing of heavy material at the beaches can be effected with the minimum of ground interference by the defender.

The *fourth priority* in ground organization consists of *localities* selected between the first and second positions (first and third priorities), to delay and disorganize the enemy, and to hold the flanks of any penetration of the first defensive position.

The *fifth priority* in organization of the ground consists of *defense areas organized between the second position and the probable objective of the enemy.* These defense areas are established on commanding terrain at key points. They are independent of one another but are capable of such mutually supporting fires as to prevent successive isolation and capture by the enemy.

□ 44. Where practicable and insofar as the peacetime means will permit, and especially at important beach areas, such as oversea possessions and bases, the organization of the

ground for beach defenses must be undertaken and carried out during peace.

■ 45. Adequate *routes of communication* are necessary to the effective conduct of the defense. Unless reserves including artillery and tanks can be moved promptly and rapidly to the area of their employment, the integrity of the defense will be jeopardized. Consequently, roads, trails, and railroads are of primary importance in coast defense. Railroads may be of great value in moving troops and supplies, especially over long distances, but they are highly vulnerable to air attack, disruption by troops transported by air, and sabotage. Even though the rail net appears to be adequate to handle all contemplated movements, the defense plans must provide for the exclusive use of motor transport for movement during combat. The construction of new roads and trails and the improvement of existing ones are continued concurrently with the construction of field works. Roads are so located and maintained in such condition that reserves may be moved rapidly by motor to areas where they may enter into combat. Artillery initially emplaced for fire on possible ship-to-shore movements should be capable of rapid transfer to other areas. Available combat aviation is employed to protect ground elements in movement.

■ 46. In the preparation for and organization of coast defense, careful plans are prepared for the employment of *obstacles* and *demolitions*. Not only conventional landing boats, but amphibious tanks and amphibious cargo-carrying tractors and small ferrylike boats which are easily beached and from which personnel and matériel can be quickly unloaded on or near the shore, must be visualized.

■ 47. Above the line of highest high tide the conventional *barbed wire entanglement*, placed in successive bands and covered with machine-gun and other automatic weapons fire, provides an effective obstacle against personnel landing from boats. To prevent concentration of the attacking force against one area of the beach defense, belts of barbed wire, covered by fire, should be extended well out into the water and perpendicular to the front. These belts must be firmly anchored in the water.

48. *Antitank mine fields* form an important element in coast defense measures. The fields are distributed in depth. Mines placed on the beach are buried above the line of highest high tide. The location of antitank mine fields is closely coordinated with other natural and artificial obstacles and with antitank gun units. The location of mine fields must be carefully recorded and friendly troops informed.

49. For a discussion of the suitability and construction of antitank land obstacles, see FM 5-30 and TF 5-145 to 5-149, inclusive.

50. *Underwater obstacles and entanglements* are placed to stop or damage landing boats approaching the shore, to block the advance of amphibious tanks and tractors, and to delay, while under fire, troops which attempt to debark and wade ashore. These obstacles and entanglements should be so placed as to strike the attacker's boats and vehicles in not less than 6 feet of water. In areas where tide variations are great, several bands of obstacles normally will be required.

Barbed wire entanglements are principally of value in stopping or delaying personnel and small boats. They are of little value against track-laying vehicles. To block amphibious tanks and tractors, steel boats, and other boats with concrete, steel, or reinforced bottoms, heavy, firmly anchored obstacles are required.

51. Landing facilities, such as piers and wharves which may be of value to the enemy in his landing operations, and bridges and culverts, especially over tidal inlets, are prepared for demolition. The authority to destroy these structures to prevent them falling into the hands of the enemy is vested in the senior military person present at each.

52. Obstacles are placed and demolitions are executed to block enemy movements through defiles and over difficult terrain. Provision must be made to cover these obstacles and demolitions by fire.

53. An extensive and elaborate system of *signal communication* is required to insure early receipt by local sector and subsector commanders of information from their observation

posts and patrols on land and water, the rapid transmission of this information to higher commanders, and the rapid transmission of orders to all elements of the defending forces. Wire circuits are provided from each command post to the reserves immediately under its control to subordinate elements down to include platoons and observation posts. All existing commercial facilities are used. To augment these and construct the necessary additional signal means, signal troops accompany advance detachments into sectors and subsectors for the purpose of planning and initiating construction of signal communications prior to the arrival of the bulk of the defensive forces.

Signal communication channels must provide for dependable multiple means for transmitting orders, information, and intelligence between the following headquarters: defense command, sectors, subsectors, air forces, harbor defenses, general reserves, sector reserves, subsector reserves, and naval district headquarters.

To avoid early disclosure to the enemy of the location of command posts and the number and location of combat troops in the area, the use of radio is held to a minimum. In general, until an enemy attack is actually begun by the movement of troops and personnel toward shore in small boats, the use of radio should be prohibited except for air-ground, air-air, ship-to-shore, and ship-to-ship communication. Once the hostile movement to shore has begun, all restrictions on the use of radio should be removed. During this critical period every means of signal communication should be available to the commanders of the defending forces.

Radio interception and direction finding should be used to the maximum in order to gain information of the enemy. When the wire system is complete and reliable, special equipment may be employed to interfere with enemy radio communications. Jamming may disrupt the radio communications of an attacker, particularly during the early phases of an attempted landing. Radio surveillance and radio interference are coordinated.

A positive system must be devised for the identification and authentication of all plain language messages. Pending the establishment of this system, messages of questionable authen-

ticity should be rapidly verified by reference to the originator.

54. The *aircraft warning service*, one of the elements of each air force, is of particular importance in coast defense. The purpose of the aircraft warning service is to alert units of the Air Force Combat Command and antiaircraft artillery units, and to warn centers of population, industrial plants, public utilities, and military and naval establishments of the approach of hostile aircraft.

When outlying islands are not available, it may be difficult to establish and maintain the necessary surface visual agencies and facilities to seaward. Advantage is taken of naval means, including offshore and inshore patrols, Coast Guard vessels, and lighthouses, to insure timely warning of the approach of hostile aircraft from the sea. In the absence of naval forces, the Army commander employs all means at his disposal to obtain the information which he normally would expect to receive from the Navy. Commandeered oceangoing vessels may be used to replace the naval offshore patrols; smaller craft to replace the inshore patrols. Army aviation is employed on long-range reconnaissance missions. The radio detector is a valuable means for locating enemy aircraft to seaward.

55. Antiaircraft artillery intelligence services established by antiaircraft artillery (see FM 4-105) are coordinated with each other and with the aircraft warning service.

56. Cooperation of the press to avoid publication of information that might be detrimental to the defense is obtained. Decisions as to methods and procedures to be used are announced promptly by the defense commander. Army and Navy officers empowered to exercise censorship of photographs and press dispatches are provided. (See FM 30-25.)

57. Because the enemy is approaching a foreign shore, often at a great distance from any area where he is firmly established, information ordinarily of lesser consequence in land warfare may assume great importance, particularly information about the weather and navigational aids, and should be suppressed.

Information of the weather, both present and future, is of primary importance to both the air and surface elements of a force engaged in operations to effect a landing on a hostile shore, and may be difficult for them to obtain. The publication of weather forecasts in newspapers or by radio broadcasting is stopped. Broadcast of storm warnings by the Coast Guard is discontinued. Routine meteorological messages for artillery or units of the Army Air Forces are not broadcast. They are transmitted as are other messages.

Any installation or device which will aid navigation of the sea or the air by the enemy forces is rendered inoperative unless its continued operation is indispensable to the defense. Marking buoys, airway beacons, and radio beacons are rigidly controlled or rendered inactive. Suitable measures are taken to assure that lighthouses cannot advantageously be used by the enemy for orientation. Operation of commercial and amateur radio stations, as such, in the coastal area is discontinued. See also discussion of control of civil radio stations, FM 11-5. The regulation or suppression of aids to sea navigation is controlled by naval forces.

■ 58. The possibility of sabotage and of espionage by enemy agents or sympathizers within the defense areas must be forestalled. All persons entering or leaving the area must satisfactorily identify themselves. Persons whose loyalty or integrity is questionable must be removed. Passengers and crew of incoming commercial or private vessels must be fully investigated so that the presence of any enemy personnel may be disclosed and the individual or group may be promptly and properly dealt with.

SECTION IV

TACTICAL DISPOSITIONS AND FUNCTIONS OF COMBAT ELEMENTS

GENERAL

■ 59. This section discusses primarily the tactical dispositions and functions of the combat elements of the subsector. Doctrines governing dispositions and functions have equal application to combat elements of any local (or unit) sectors which may be organized.

60. The tactical dispositions for the defense of the subsector or local sector are based on the consideration that the attacker is weakest while he is in landing boats or is attempting to debark from these boats and gain a foothold on shore, and strong counteraction by the defender at this time promises the greatest chance of defeating him. This consideration does not justify the massing of the defending forces at the beach. It does require a careful estimate of the situation in each area and a solution of each problem which provides defense at the beach, defensive positions in rear of the beach from which effective counteraction can be taken should a landing on the beach be successful, and suitable mobile reserves.

The principal combat elements of a subsector are—

a. Outpost and advanced covering forces, including subsector beach and boat patrols.

b. Harbor defenses and subsector artillery. Subsector artillery may include both field artillery and mobile coast artillery units.

c. Subsector reserves.

OUTPOST AND ADVANCED COVERING FORCE SYSTEM

61. The *outpost* and *advanced covering force* system includes: naval local defense forces; aviation; offshore islands; mine fields, and other obstacles; and the Army outpost system.

The principal missions of the outpost and covering force system are: to collect and disseminate information and intelligence; to disorganize, block, or delay the enemy; and to furnish security for important elements on or near the shore line against sudden raids and sabotage by enemy sympathizers.

During the earlier phases of coast defense, the Army outpost forces are limited to those necessary to supplement naval and air elements. Troop dispositions are readjusted depending on the effectiveness of naval and air forces. When the enemy arrives within striking distance of the coast, final dispositions are made for resisting a landing attack in accordance with predetermined plans. Outpost forces may be augmented by additional infantry, artillery, antitank elements, mobile searchlights, and chemical troops.

Considering the length of the beach and the distance to local reserves, the strength of the outpost should be such that its fire power can arrest the leading landing waves until reinforcements can arrive.

■ 62. An *outpost* should be strong in automatic and antitank weapons. It is organized into a reserve and the necessary supports. The reserve is usually located in rear of the first defensive position (first priority), with particular reference to the road net leading to the most probable landing areas (see par. 43). Supports are generally disposed on or near the most important tactical localities of the first defensive position. Supports furnish crews for day and night observation posts and for manning the beach automatic and antitank guns. Because of their power, accuracy, and rapidity of fire, antitank weapons and light artillery pieces emplaced near the beach constitute highly important means of opposing ship-to-shore movements in small boats. At night and during periods of low visibility, the supports send forward additional detachments to patrol important sections of the shore line. Observation and patrolling activities can be reduced materially during periods of good visibility. Troops are given the maximum rest during daylight hours when visibility is good.

■ 63. The defense at the beach ordinarily is initially charged to the outpost forces. Their mission is to break and disorganize the efforts of the attacker en route to the shore and at the water's edge and to block or delay his advance inland. To accomplish their mission, outpost forces must fight at the beach. They withdraw from their forward position to rearward positions *only* on order of subsector or higher commanders. It is fundamental that withdrawal from forward positions is ordered only if it is evident that reinforcements will arrive too late or in insufficient force and the defeat of the outpost troops will leave no effective elements to block or delay the advance of the enemy inland.

The troops of each outpost should be fully motorized and so organized as to permit the rapid employment of the whole or a part of the force at another threatened beach when no attack is directed at its beach.

Against an enemy equipped with tanks, amphibious vehicles, and armored boats the outpost elements along the beach must be provided with antitank guns.

64. The outpost positions nearest the water must provide for the maximum density of enfilade small arms fire at and immediately in front of the water's edge. They are manned principally by small combat groups with light machine guns, automatic rifles, and antitank guns. Defense areas are organized at key points in rear. Heavy machine guns and mortars are located in these defense areas from which they can deliver long-range fires on boats approaching the beach, and be in position for close-range missions against enemy elements which have landed.

SUBSECTOR BOAT PATROL GROUPS

65. As a supplement to the beach observation system, the subsector commander organizes *subsector boat patrol groups*, each consisting of a group base of operations and boats armed with machine guns and small cannon. These boat patrol groups provide the subsector commander with independent means to extend his outpost system beyond the shore line, and reduce the number of troops which would otherwise be required for beach patrol. Boat groups do not displace the naval inshore patrol. They cover water areas adjacent to the shore inside the zone of action of naval forces.

66. The number of boat groups organized in each subsector depends upon the total length of coast line to be patrolled, shore facilities, such as bays and harbors, and the number and cruising radii of boats available. All sections of the coast where landings are practicable, and the approaches to harbor defenses and other important water areas, should be patrolled. The patrol zone normally extends about 2 miles offshore. Inshore underwater obstacles, such as mine fields, in this zone, are kept under observation.

67. Subsector boat patrol groups patrol their entire assigned zones at night, and in the daytime during periods of low visibility; and patrol at all times those parts of their assigned zones not covered by terrestrial observation systems.

68. The missions assigned each group should include the discovery and prompt report of hostile forces within or approaching its zone, especially those approaching inshore underwater obstacles; the penetration of inshore smoke screens laid by the enemy; and in the event of a landing attack, to

inflict the maximum damage and disorganization to enemy personnel and matériel.

■ 69. Patrol boats are requisitioned from commercial and private sources and are manned by suitable personnel experienced in operating small boats in local water areas.

■ 70. Group bases and as many individual patrol boats as practicable should be equipped with means for radio communication with each other, with the naval inshore patrol, with harbor defenses, and with the nearest subsector and outpost detachment headquarters.

■ 71. A visual signal communication system is organized for challenging purposes, and to identify and transmit information and intelligence between patrol boats and shore observation stations, between patrol boats and naval inshore patrol vessels, and between the patrol boats themselves.

DEFENSIVE POSITIONS

■ 72. The characteristics, selection, and organization of defensive positions have been discussed in paragraph 43.

RESERVES

■ 73. Reserves are a means in the hands of the commander whereby he can favorably influence the coast defense operations by providing timely reinforcement at areas under attack. The initial positions of reserves are governed by their mobility, the road net, and the location of critical areas. Reserves should be motorized and their positions should permit dispersion and concealment either by natural or artificial means. Protection against hostile combat aviation and naval gun fire is of major importance. Careful consideration must be given to the effect of hostile combat aviation on the road net, especially at defiles, and on the movement of reserves during daylight.

Complete plans and alternate plans for the employment of reserves are prepared and rehearsed. These plans include provisions for strict regulation of traffic, including refugee and civilian, to assure rapid movement. Standing operating procedure for each plan is prepared and issued to subordinate commanders. This procedure must be so flexible that the

task assigned the reserve is assured of execution even though unforeseen contingencies arise.

74. *Local sector reserves* support the action of the outpost forces by intervening to assist these elements. The fundamental consideration in their employment is that the enemy is to be defeated before he can gain a firm foothold on the beach. Support of the outpost forces may be accomplished by the occupation of beach positions to reinforce the fire of the outpost forces; it may be effected by a counterattack or by a combination of these actions. Should aggressive action fail to prevent the landing of the attacking force, its further advance inland is blocked or delayed, pending the arrival of additional forces.

75. The *subsector reserve* includes the bulk of the force assigned to the subsector. The mass of the artillery must be available to support the action of the reserve even though it is emplaced initially for support of forward elements.

The subsector reserve is disposed in one or more groups so located that reinforcement of any portion of the shore line can be effected with a minimum loss of time.

Subsector commanders must not hesitate to use their reserves to repel landing attacks. Early reinforcment of the outpost forces at areas where landing operations are in progress may prove decisive. To delay decisive action until the reserve as a whole can be employed in a fully coordinated effort may transfer a time advantage to the attacker which the defender cannot afford to lose. In many situations, piecemeal intervention by the reserves, either to counterattack or reinforce the forward elements by fire, promises the greatest chance of successfully defending the coast line under attack. Should the enemy succeed in landing and efforts to dislodge him fail, subsector forces must block further advance or so conduct their operations as to obtain the maximum delay.

76. *Sector reserves* are located in one or more groups, prepared for prompt movement to probable landing areas within subsectors. The size, composition, and disposition of these reserves are largely governed by the total strength of the force allotted the sector commander, the road net, and the number of important landing areas in the sector. Bear-

ing constantly in mind the fundamental consideration that the most favorable time to defeat a hostile landing is that period while the enemy is in small boats or debarking from these boats and attempting to gain a foothold on shore, the sector commander must weigh carefully the requirements in personnel and equipment of those elements near the shore; he must not deprive them of the means necessary to accomplish their mission in order to obtain a larger sector reserve. In one situation the sector reserves may consist of the major portion of the forces available to the sector commander, whereas in another situation the sector reserve may be comparatively small. The reserve should consist of infantry, either organically motorized or with motors attached, mechanized units, motorized artillery, antiaircraft artillery, antitank and combat engineer units, with provision for combat aviation support during movement.

■ 77. *Reserves of echelons higher than sectors* (army, defense commands) generally consist of large units such as corps, divisions, and auxiliary units disposed in depth and breadth on favorable routes of communication leading to the various sectors. Whereas partial reinforcement of beach defense elements by units of these reserves is often necessary and desirable, the fundamental doctrine underlying their employment is the striking of a powerful coordinated blow to crush enemy main attack forces which have succeeded in landing.

■ 78. During the period when sector and higher echelon reserves are held in readiness, some elements of these forces may be located so as to provide incidental protection for important objectives which might be seized or destroyed by troops transported by air or enemy sympathizers. The location and disposition of these reserve elements for this purpose must not delay their movement nor interfere with their participation in operations to repel landings. This provision does not decrease the necessity for maintaining permanent defense units at important installations.

■ 79. The *movement of sector and higher echelon reserves* may be made by air, motor, rail, or water transportation, or a combination of these means. Provision is made for antiaircraft defense during movement. Sector and higher echelon

reserves begin movement immediately it becomes apparent that the enemy has committed himself definitely to a main attack at a particular locality. Factors which assist the higher commander in determining the major enemy effort include the comparative number of transports and the number, size, and composition of naval vessels assembled offshore, the number of landing boats employed at various localities, the concentration of enemy air activity, the extent of the various fronts over which operations are conducted, the existence of suitable landing beaches, and the probable initial major objectives of the enemy. Information from friendly naval air and surface elements prior to and during landing attempts is of special value in assisting the higher Army commanders to estimate enemy capabilities.

■ 80. In determining the time, manner, and place in which *reserves of sector and higher echelons* will be employed, commanders may often be confronted with situations in which they have inaccurate or inadequate information of what is actually occuring on the various fronts. They may also receive urgent requests for assistance from civil authorities where communities are in danger. Provision for adequate and rapid means of signal communication from observation posts all along the beach, from boat patrols, and between the various headquarters will assure the timely transmission of information and will greatly assist the commander in reaching a sound decision for the employment of reserves. Liaison officers are particularly valuable in obtaining and transmitting information.

Reserves must be employed on missions which further the successful execution of the primary mission of the force. They must not be dispersed on tasks which do not contribute to the accomplishment of this mission.

■ 81. When sector and higher echelon reserves intervene in the action, troops already engaged, including all available artillery, mechanized forces, and combat aviation support their action. Naval forces, including aviation, may be assigned missions in support of these reserves.

CONDUCT OF SUBSECTOR FORCES AGAINST ATTACK

■ 82. Enemy attacks may be made during daylight or at night. The principal advantages to the attacker of a night

attack are assistance in securing tactical surprise and a reduction in the effectiveness of the defender's fire whereas during daylight the attacker gains greater advantage of air and naval superiority, the navigation of ships and landing boats is facilitated, and shore operations are easier to execute.

■ 83. An alarm system is organized in each subsector for alerting the command in the event of an attack. The system may include signals to cause troop units in bivouac to assemble, to move to the entrucking points, and to entruck and move out. Troop units in bivouac are trained to entruck and move out in 15 minutes, or less.

■ 84. Against an attack made during daylight, the defender's system of observation functions at maximum efficiency. Troops can be moved with greater celerity and less confusion and disorganization than at night. Protection of the movements is gained by using previously reconnoitered concealed routes where possible and by support of combat aviation.

In resisting a daylight attack, all elements that can meet the attack at the landing beaches place fire on hostile troops while they are in small boats approaching the shore. This fire is particularly destructive while personnel or boats are delayed by obstacles. Early reinforcement of these forward elements may prove decisive in defeating the landing at the beach. Subordinate commanders must be imbued with an aggressive spirit and the willingness to seize every opportunity to effect the early repulse of the enemy. (See pars. 74 and 75.)

If the forces defending at the beach are forced to fall back, they occupy and defend successive organized tactical localities. The forward defensive works (first priority) (see par. 43) are held stubbornly in order to disorganize, delay, and limit the hostile advance and gain time for the arrival of reinforcements.

■ 85. At night the defense force at the beach is ordinarily limited to small detachments charged with observation and the operation of the beach defense weapons. Of primary importance is provision for the laying and fixing of all machine guns along the final protective line. Plans are prepared and rehearsed for the movement forward at night of outpost supports and reserves to meet a night attack. Plans are revised as necessary. A definite plan of action may be

prepared and announced to the troops each day, covering possible operations for the following night. The plan for a particular night may be influenced by indications of enemy activity observed during the day. In order to confuse enemy agents or sympathizers it is advisable to change the plan of action for each night.

86. *General counterattacks* by subsector and larger reserves are coordinated with reference to time, place, direction, and supporting elements. In general, these counterattacks are made against the main landing effort as soon as the main landing can be definitely determined.

At night the situation may be so obscure and uncertain that coordinated action by large units may be impracticable. Accordingly, general counterattacks by subsector and larger reserves are usually made during daylight hours. During darkness, however, pressure can be exerted on enemy forces ashore by troops of the outpost, and reserves can be moved to assembly positions preparatory to counterattacking at daylight.

When practicable, all counterattacks are made against a flank of the hostile force. The counterattacking force, however, should not be exposed unnecessarily to enfilade fire from the hostile navy.

All counterattacks are supported, insofar as practicable, by units already engaged. Combat aviation, tanks, and all types of available field and mobile seacoast artillery should be utilized to the maximum in support of counterattacks by battalions or larger units. Special effort should be made to protect the counterattacking force from attack by hostile aviation.

87. Aggressive patrolling and raids into the hostile rear areas are executed as a normal procedure by all commanders in contact with a hostile force which has succeeded in landing.

88. When it appears that the enemy has definitely committed all of his available forces to the landing attack and has succeeded in gaining a foothold on shore, the troops of inactive sector and subsectors, except small outpost detachments, may be assembled and moved to the scene of the landing operations, to be employed as the tactical situation requires.

FUNCTIONS OF COMBAT ELEMENTS

■ 89. This section discusses the functions and characteristics of the combat elements as particularly applicable in coast defense operations. Doctrines governing the employment of the land forces against an enemy who has effected a landing are fully discussed in FM 100-5. The conduct of the outpost and covering forces and the general employment of the defending forces to repel landings have been discussed in previous sections of this manual.

■ 90. Units of *mobile seacoast artillery* and *field artillery,* especially 155-mm guns, frequently will be employed on the same missions. Their fire missions are carefully coordinated by the subsector commander. Field artillery units normally are neither trained nor equipped to fire on moving naval targets. Consequently, special training and equipment for these units will be necessary.

■ 91. *Mobile seacoast artillery* for use in coast defense consists of two types, namely, 155-mm gun artillery and railway artillery. Units of both types are trained and equipped to fire on moving naval targets. The 155-mm gun has the same characteristics as the field artillery 155-mm gun. However, the sight used by the Coast Artillery Corps is different from that used by the Field Artillery.

■ 92. Railway artillery possesses strategic mobility to a high degree but its tactical mobility is limited. Several types and calibers of railway artillery are suitable for use in coast defense. The calibers and important characteristics of some of the types are as follows:

Caliber	Type cannon	Angles of traverse	Maximum horizontal range
Inch			*Yards*
14	Gun	7 [1] and 360° [2]	48,200
12	do	10 [1] and 360° [2]	30,100
12	Bortar	360°	14,650
8	Gun	360°	33,850

[1] Total traverse on the carriage when the gun is emplaced on the track without base ring.
[2] 360° traverse when the gun is mounted on a prepared emplacement with base ring.

When a mobile seacoast artillery unit is attached to a subsector and is emplaced within or near a permanent or temporary harbor defense, the subsector commander usually exercises tactical control through the harbor defense commander. When emplaced in other areas, the subsector commander usually exercises tactical control through the subsector chief of artillery.

93. In coast defense operations, the specific *missions of 155-mm gun artillery* are to execute fires to defend mine fields, submarine, and torpedo nets; prevent close approach of hostile transports for transfer of troops to landing boats; neutralize and destroy hostile lightly armored and unarmored craft; destroy hostile small boats transporting landing parties, particularly while beyond range of light artillery; enfilade the beaches on which hostile forces are landing; and neutralize and destroy hostile elements which have landed, particularly artillery and mechanized units.

94. Appropriate targets for 155-mm gun artillery include troop transports, lightly armored cruisers, destroyers, mine sweepers and layers, submarines awash, lighters, small boats carrying landing parties, and hostile elements ashore, particularly artillery and assembled mechanized elements. Since this artillery is not at present provided with armor-piercing projectiles, it should not be employed to fire on armored ships as a normal procedure. With targets at very short range, the destruction of fire-control and signal-communication installations housed in the upper works of armored ships constitutes a suitable and remunerative mission.

95. There should be sufficient 155-mm gun artillery in a sector to cover the water areas within which operations of enemy lightly armored and unarmored craft would materially further the mission of the attacker. In addition to protecting Army subzmarine-mine fields, naval contact-mine fields are protected when practicable.

96. Units of 155-mm gun artillery allotted to a sector are normally attached by the sector commander to one or more subsectors. When there is insufficient heavy field artillery in a sector, the sector commander initially may hold some of the seacoast artillery 155-mm gun units in sector reserve.

■ 97. *Missions of railway artillery* in coast defense are to reinforce the fixed armament of coastal fortifications, and to assist in the defense of certain harbors or parts of the coast where no permanent fortifications have ben installed.

■ 98. The employment of railway artillery is analogous to the employment of fixed armament in harbor defenses. Capital ships are the usual objectives for the heavier armament, whose principal mission will be to compel supporting naval vessels to remain offshore beyond effective supporting range. Troop transports are also suitable targets.

■ 99. The assignment and employment of railway artillery in coast defense is based upon plans prepared in peacetime and modified as required to meet situations existing during hostilities. The preparation of these plans requires a consideration of the extent, condition, and availability of existing trackage; quantity and character of available railway artillery; the limitations of other available artillery; and a determintion of water areas to be protected. Plans should establish a complete system of camouflaged alternative firing positions which will facilitate the prompt movement and reemplacement of this armament and the supply of ammunition during various situations that may arise in contemplated tactical operations. Dummy positions and trackage, and camouflage assist in maintaining secrecy as to the actual location of armament.

■ 100. The first requirement in the employment of railway artillery is the availability of the necessary trackage so located that the armament may be emplaced to deliver effective fire. This requirement demands a consideration of the railroads leading into and within the sector, and their availability for the movement, emplacement, and ammunition supply of the armament. The primary considerations are the general location of the railroads and the location of suitable firing positions. Other influencing factors are: requirements for the use of the railroads for the movement and supply of other forces, the possibility of interruption of railroads by enemy gunfire or aviation, the capacity and location of bridges and trestles, the dimensions of tunnels and similar features affecting the movement of railway armament, and the availability of suitable sidings for use as storage tracks.

101. Because of the great width of the front ordinarily involved in coast defense operations, the railway artillery at the disposal of a *defense command* commander is assigned to the various sectors in accordance with the general defense plan and the current situation. The portions assigned pass to the direct control of the sector commander concerned.

102. Railway artillery assigned to a sector is used to augment the armament of harbor defenses, to provide major-caliber armament for the protection of important water areas which are not protected by permanent armament, or, *rarely*, to constitute an artillery reserve. That portion of the railway artillery which is assigned to fixed harbor defenses, or to the defense of water areas outside of fixed harbor defenses, becomes relatively localized. Such artillery is placed under the command of the respective subsector commanders.

103. The distribution of railway artillery battalions is based upon the locations of the sections of the coast which are to be protected by heavy armament, rather than upon the employment of the regiment as a tactical unit. In coast defense operations, battalions frequently are so widely separated that control by the regimental commander is impracticable. *Groupments* of battalions from different regiments may be organized.

104. *Searchlights* of the coast artillery which are employed outside of harbor defenses are normally placed under control of a coast artillery groupment commander. They are disposed in positions which will enable them to illuminate effectively critical water areas and sections of the beach. They should be kept out of action until it is known definitely that hostile craft are operating within effective ranges and thereafter they should be used only at critical moments.

105. The mass of the *subsector field artillery* must be able to oppose a hostile main attack and to support a counter-attack by the subsector reserve. Until the location of the main attack is known, a large part of this artillery is employed to support troops actively engaged in defending a beach. A favorable road net and motor transportation increase the amount of artillery that can be emplaced initially.

Positions are sought close to good roads in order to facilitate the withdrawal and prompt displacement of firing units.

106. *Light artillery* with the outpost detachment is emplaced well forward in the probable landing areas so that it can employ direct fire on enemy ship-to-shore movements, support organized tactical localities along the shore line, and enfilade critical sections of the beach. The remainder of the available light and medium artillery is placed in position in depth in rear of the first defensive position so as to avoid being captured by the first rush of hostile forces who may succeed in reaching the shore, and so that it can fire effectively on critical beach areas and in support of organized tactical localities of the first defensive position. It is desirable that light guns be able to fire by direct laying on hostile ship-to-shore movements. Alternative positions are selected for all artillery units to facilitate rapid displacement and resumption of fire if any position is rendered untenable. All artillery is concealed or camouflaged against marine, terrestrial, and aerial observation.

107. The use of field artillery in operations against an enemy force ashore conforms to the doctrines enunciated in FM 100-5 and FM 6-20.

108. Major tasks of *engineers* in coast defense are: to execute extensive and detailed terrain, beachline, and offshore reconnaissance; to prepare, reproduce, and distribute maps or map substitutes; to construct and maintain roads, railroads, and airfields; to recommend measures for deception and camouflage and to execute such measures of the counterintelligence plan as specifically directed; if so directed, to remove all road signs or to alter them so as to mislead invading forces, or to signpost important routes of movements for reserves with special signs or other means; under the direction of the sector or subsector commander, to lay out and construct certain defensive works, utilizing commercial equipment, transportation, and civilian labor, as available and needed; to prepare for destruction, floating equipment and landing facilities, such as piers and wharves, which may aid hostile landing operations, and to destroy them, if necessary, to prevent their falling intact into the

hands of the enemy; to construct underwater and land obstacles for the purpose of delaying a hostile landing and an advance inland; to prepare for demolition, bridges, culverts, and viaducts over tidal areas and streams; to assist in clearing fields of fire on favorable landing beaches and to destroy structures which might protect or conceal the enemy; to supply necessary tools and materials for the construction of defensive works; and to provide potable water for the defense, and to install land mines.

Engineering work in coast defense requires time and careful planning. Consequently, engineer troops should be among the first to reach the areas that are to be defended.

■ 109. When *chemicals* are to be employed, they provide additional means for strengthening the defense.

By contaminating selected areas, supports can be more widely spaced and a greater frontage can be defended. Persistent chemicals are particularly valuable in sections where fields of fire are poor near the shore. The defender should hold landed troops within contaminated zones. Chemical mines, placed along the beach, are exploded when a landing is attempted. Some persistent chemicals will float on water where they are very effective against personnel who are compelled to wade ashore. Contamination of demolitions may be made with persistent agents. Exposed flanks may be protected by barriers of chemical mines. Chemical shell may be employed to contaminate landing beaches and exposed flanks, particularly on terrain where mines cannot be used to advantage.

Smoke may be used to conceal the movement of reserves and other defense measures taken to repel attack.

■ 110. The employment of the *Air Force Combat Command* has been discussed in paragraph 5.

■ 111. *Reconnaissance and observation aviation* may be attached to sectors during the reconnaissance and preparation phase. (See par. 9.) As the threat of hostile attack becomes more imminent, some of this aviation may be allotted to subsector commanders. Patrol of sea areas by such aviation is coordinated with the Army Air Force Combat Command and naval aviation. (See FM 1-20.)

■ 112. Suitable photographic missions for observation, reconnaissance, and photographic aviation prior to and during the reconnaissance and preparation phase include: photographs for the preparation of photo maps of the more important coastal areas, to include the probable rear limit of each combat zone; aerial photographs for the preparation of overlapping strips of the entire coast line for the purpose of assisting the defense in determining possible landing areas, the locations for installation of underwater obstacles, mine fields, observation posts, and supplementary fire-control stations; photographing the wave heights at vulnerable beaches under varying conditions of wind and tide; preparation of stereograms to show detail of cover and defilade, especially for gun positions; and photographing areas immediately before occupation by ground troops for .the purpose of checking camouflage discipline.

■ 113. Suitable photographic missions after ground troops have occupied the combat zone include: preparation of photographs for the purpose of checking camouflage discipline for concealment of troops, matériel, and mine fields; photographic reconnaissances to assist in discovering and determining the strength of the enemy's main and secondary landings and feints, beachheads, penetrations, and for similar purposes; photographing enemy naval forces within the range of supporting aviation; photographic reconnaissance of enemy airplane and seaplane bases and advanced landing fields; and photographing results of bombing operations.

■ 114. *Antiaircraft artillery units* are the framework of a coordinated system of ground defense against air observation and attack. Antiaircraft artillery is carefully coordinated with pursuit aviation and organic weapons of other tactical units.

Among the elements which require protection against air observation and attack are harbor defenses, mobile artillery, reserves in bivouac and in movement, airdromes, air bases, critical points on lines of communication, naval bases, important utilities, centers of government, and other establishments possessing military value. The relative importance of these elements in the defense plan determines priorities for their defense.

Prompt establishment of an antiaircraft artillery intelligence service and its coordination with the aircraft warning service are essential. (See par. 54.)

115. Sector and subsector commanders employ every practicable means of passive antiaircraft defense such as concealment, cover, camouflage, deception, and dispersion, for protection against air observation and attack.

116. *Signal Corps* functions are discussed in paragraph 53.

117. *Armored units* are employed in mass against hostile elements which have succeeded in establishing a lodgment on shore. As part of a counterattacking force they constitute a powerful weapon in the hands of the commander with which to annihilate the enemy ashore. The participation of all available supporting fires and units, including combat aviation, is coordinated with the action of the armored units. (See FM 100-5 and FM 17-10.)

118. *GHQ tank battalions* may be allotted to sector, subsector, and local sector commanders. Tank units in subsector and local sector reserve may be advantageously employed to assist the outpost forces in repelling the first enemy attempts to land.

119. *Motorized divisions* are particularly suitable to assist the attack of armored units. Motorized divisions in general reserve provide the commander with a highly mobile, powerful force which can be rapidly employed in decisive areas. To gain the maximum effect from these divisions, their movement to and engagement in combat must have the protection of local air superiority.

APPENDIX

GLOSSARY

Defense command.—The defense command is a territorial agency, within the continental United States, with appropriate staff designated to coordinate or prepare and to initiate the execution of all plans for the employment of Army forces and installations in defense against enemy action in that portion of the United States lying within the command boundaries.

Sector.[1]—A sector is one of the subdivisions of a defense command.

Subsector.[1]—A subsector is one of the subdivisions of a sector.

Local sector.[1]—A local sector is one of the subdivisions of a subsector.

Harbor defense.—A harbor defense is a highly organized administrative and tactical Army command established to defend a limited portion of a coastal area primarily against attacks from the sea.

Beach defense.—A beach defense is that part of the Army ground organization, for defense against landing attacks, which is located at or near the beach for resistance at the water's edge. It consists of a series of organized tactical localities generally in rear of those sections of the shore line where landings are likely to be made, and includes barbed wire entanglements and other obstacles and demolitions below and above the water line.

Aircraft warning service.—An aircraft warning service consists of an intelligence net and a warning system. The purpose of the aircraft warning service is to warn centers

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[1] The terms *sector, subsector,* and *local sector* are based largely on geographical considerations, in order to avoid, as far as practicable, division of responsibility for the defense of important areas which also are possible objectives for the enemy. These terms should not be confused with the term *sector* as used in purely land defense, where the limits are dependent upon the tactical units occupying the areas, such as *corps sector, division sector,* or *regimental sector.* It should be noted that all sectors may not be divided into subsectors; a subsector is so defined in this manual for simplicity.

of population, industrial plants, public utilities, and military and naval establishments of the approach of hostile aircraft, and to alert units of the Air Force Combat Command and antiaircraft artillery units. It furnishes pursuit aviation with detailed, timely, and continuous intelligence necessary for pursuit interception. It consists essentially of observers, of radio detectors, of information centers—centrals and subcentrals—and of the necessary signal communications for plotting the courses and distributing information of approaching hostile aircraft. *Warning systems* are established in all military and naval units.

Antiaircraft artillery intelligence service (AAAIS).—An antiaircraft artillery intelligence service is a signal communication and information net established by antiaircraft artillery units. Its purpose is to gather and transmit information of hostile air activities necessary for the proper employment of the antiaircraft artillery. In general, the signal communication net of this service is not as extensive as that of the aircraft warning net. Antiaircraft artillery intelligence services should be coordinated with the local agencies of the aircraft warning service. (See FM 4-105.)

Naval district.—A naval district is a military and administrative command established ashore for the purpose of decentralizing the Navy Department's functions with respect to the control of shipping in the coastal zones and the shore activities outside of the Navy Department proper, and for the further purpose of centralizing under one command within the district and the waters thereof:

(1) For military coordination, all naval activities; and

(2) For administrative coordination, all naval activities with specific exceptions.

The primary purposes in view are to provide for naval mobilization and logistic support of the fleet, and to utilize the district naval forces in the joint organization to provide security for the coast and for shipping in the coastal zones. The limits of the naval districts are prescribed in Navy Regulations. The outer limits include the coastwise sea lanes.

Each naval district is commanded by a designated commandant who is the direct representative of the Navy Department, including its bureaus and offices, in all matters affecting district activity.

Naval local defense forces.—Naval local defense forces consist of naval forces (including, in time of war, the Coast Guard and Lighthouse Service), afloat and ashore, attached to a naval district and under the command of the commandant of the district. These forces are not a part of the fleet.

Naval base.—A naval base is a center from which naval forces can operate and be maintained.

Coastal zone.—The coastal zone is the whole area of the navigable waters adjacent to the seacoast. It extends seaward to cover the coastwise sea lanes and focal points of shipping approaching the coast.

Defensive sea area.—A defensive sea area is a portion of the coastal zone, usually including the approach to an important port, harbor, bay, or sound, within which, if such area be publicly proclaimed and neutrals notified, international practice tacitly permits the belligerent to extend his jurisdiction with a view to the protection of neutral shipping from mine fields, obstructions, or the danger of being considered hostile. A defensive sea area is established by proclamation of the President and by notification to neutrals. The limits of a defensive sea area must be contained in the proclamation, and should be such that control of shipping in the area is within the capacity of the available naval local defense forces.

Defensive coastal area.—A defensive coastal area is a part of a coastal zone and of the land and water adjacent to and inshore of the coast line within which defense operations will involve both Army and Navy forces, and in consequence, will require effective coordination. A defensive coastal area pertaining to a fortified harbor includes the *outer harbor area,* the *harbor channel area,* and the *inner harbor area;* its outer limits, which are specified in each case in joint plans, are the outer limits of the ranges of the shore defense batteries. When a defensive sea area and a defensive coastal area coexist in any one locality, the water area of the defensive coastal area which lies between its outer limits and the inner limits of the harbor channel area, is superimposed upon a like portion of the defensive sea area, without in any way detracting from the Army's responsibility for the direct defense of the coast. Defense activities in that portion of a defensive sea area not included within a defensive coastal area are essentially

naval in character. They are of immediate interest to the Army because these activities may disclose the presence and indicate the objectives of enemy forces.

Outer harbor area.—The outer harbor area is the water area which extends to seaward from the outer exits of the entrance channels to a fortified harbor, and which lies within range of the harbor defense batteries.

Harbor channel area.—The harbor channel area is the water area which lies between the outer harbor and the inner harbor area, and which comprises all the entrance channels to the harbor.

Inner harbor area.—The inner harbor area is the entire water area of a fortified harbor inside the inner entrance of all the entrance channels to the harbor.

Inshore patrol.—An inshore patrol is a part of the naval local defense forces operating generally within a defensive coastal area and controlling shipping within a defensive sea area.

Offshore patrol.—An offshore patrol is a part of the naval local defense forces operating in and patrolling the coastal zone outside of those areas assigned to the inshore patrol.

	Paragraphs	Pages
Advance detachments, missions	12	5
Advance covering force	61–64	23
Agents, intelligence services	10	5
Air annex, preparation	39	13
Air attacks	5	2
Air Force Combat Command	5, 54	2, 21
Air forces (*see also* Army Air Forces; Air Force Combat Command; Combat aviation; reconnaissance aviation; Navy aviation)	5	2
Air landing troops. (*See* Troops transported by air.)		
Air reconnaissance	13, 53	6, 20
Air superiority	24, 82, 119	9, 29, 39
Aircraft warning service	54, App.	21, 40
Airway beacons, control	57	21
Alarm system	20, 83	18, 30
Allocation of mobile forces	41	15
Anchored obstacles	50	19
Antiaircraft artillery, employment	54, 114	21, 38
Antiaircraft artillery intelligence service	55, 114, App.	21, 38, 40
Antiaircraft defense. (*See* Antiaircraft security.)		
Antiaircraft security	79, 86	28, 31
Antitank mine fields	48, 49	19
Antitank units, employment	61, 62	23, 24
Armed forces in coast defense	1–6	1
Armored units, employment	117	39
Army Air Forces	5, 39	2, 13
Army liaison officers	3	1
Army, missions	2	1
Army mobile forces, mission	3	1
Artificial obstacles	48	19
Artillery:		
Antiaircraft	54, 55, 114, App.	21, 38, 40
Field:		
Employment:		
Against an enemy force ashore	107	36
Counterattack	105	35
Main attack	105	35
Ship-to-shore movements, against	45, 18, 61, 62, 106	18, 23, 24, 36
Support of organized position	106	36
Light	106	36
Subsector	105	35
Withdrawal of firing units	105	35
Mobile seacoast:		
Assignment	95	33
Control	92	32
Missions	93	33
Sector reserve	96	33
Targets	94	33
Types	91	32
Railway:		
Assignment	99, 101, 102	34, 35
Availability of trackage	100	34
Battalions, distribution of	103	35

	Paragraphs	Pages
Artillery—Continued.		
Railway—Continued.		
Calibers and characteristics	93	33
Employment	99	34
Missions	97	34
Targets	98	34
Types	92	32
Assignment:		
Mobile seacoast artillery	95	33
Railway artillery	99, 101, 102	34, 35
Attacks, enemy:		
Daylight	82, 84	29, 30
Night	82, 85	29, 30
Availability of trackage, railway artillery	100	34
Bases:		
Naval	App.	40
Protection by Army	2	1
Seizure by defender	5	2
Battalions, railway artillery	103	35
Beach defense:		
Definition	App.	40
Organization of the ground	44	18
Beacons, airway, control	57	21
Boat patrols:		
Communication system	70, 71	26
Composition	65	25
Missions	68	25
Number in each subsector	66	25
Patrolling	67	25
Requisitioning of boats	69	26
Bombardment aviation. (*See* Combat aviation.)		
Calibers, railway artillery	92	32
Camouflage	43	15
Censorship	56, 57	21
Chemicals, employment	61, 109	23, 37
Civil defense agencies, employment	12	5
Civil radio stations, control	57	21
Civilian labor, hiring	11, 12	5
Climatic conditions affecting enemy action	37	12
Coastal zone, definition	App.	40
Coast Guard:		
Lighthouses	54, 57	21
Storm warning broadcast	57	21
Vessels	54	21
Combat aviation	5	2
Coordination with armored units	117	39
Counterattacks	5, 32, 86	2, 11, 31
Hostile	31, 73	11, 26
Neutralizing hostile bases and assembled matériel	19	7
Protection of ground elements in movement	45	18
Support of reserves	76, 81	27, 29
Command	39	13
Commandeered ocean-going vessels	54	21
Commanders:		
Army	54	21
Sector (*see also* Sector)	6, 11, 12, 15, 39	3, 5, 6, 13

	Paragraphs	Pages
Commanders—Continued.		
Subordinate	22	8
Subsector (*see also* Subsector)	6, 11-13, 39, 41, 65	3, 5, 13, 15, 25
Unit	16, 20	7, 8
Commercial facilities, requisition and use	11, 12, 69	5, 26
Concentration of effort	22	8
Control:		
Mobile seacoast artillery	92	32
Traffic	16, 73	7, 26
Coordination, Army and Navy	5, 39	2, 13
Counterattacks:		
Launching	30	10
Protection from hostile aviation	86	31
Subsector and larger reserves	86	31
Support by—		
Artillery	86, 105	31, 35
Combat aviation	5, 32, 86	2, 11, 31
Tanks	86	31
Counterintelligence	12	5
Covering forces (*see also* Outposts)	61	23
Daylight attacks by enemy	82, 84	29, 30
Defense areas	64	25
Defense command	39	13
Definition	App.	40
Defense, factors favoring	42	15
Defense, stages:		
Intensified reconnaissance and preparation	10–16	5
Estimate of enemy's capabilities	10	5
Intelligence services	10	5
Sector commanders:		
Designation	11	5
Mission	12, 15	5, 6
Subsector commanders:		
Designation	11	5
Information and instructions furnished	11	5
Missions	12	5
Personal reconnaissance	13	6
Position in readiness	17–20	7
Combat aviation, employment	19	7
Definition	17	7
Enemy operations during	18	7
Joint training during	20	8
Naval local defense forces	19	7
Outpost detachments	19	7
Resistance	21–34	8
Combat aviation, employment	31, 32	11
Commanders	22–24, 30	8, 10
Concentration of forces	22	8
Counterattacks	30, 32	10, 11
Enemy operations during	21	8
Hostile air superiority	24	9
Minor attacks	33	11
Outposts (*see also* Outposts)	22, 27	8, 10
Reinforcing elements, employment	30	10
Reserves	25, 28, 29	10
Defensive coastal area, definition	App.	40

	Paragraphs	Pages
Defensive positions	13, 43, 72	6, 15, 26
Defensive sea area, definition	App.	40
Defensive works, priorities	43	15
Definitions	App.	40
Demolitions (*see also Mines;* Obstacles)	20, 43, 46–52, 108, 112	8, 15 18, 36, 38
Destroyers, use	3	1
Destruction, landing facilities	51, 108	19, 36
Dummy positions	99	34
Enemy operations. (*See* Operations, enemy.)		
Engineers, employment	42–52, 76, 108	15, 27, 36
Entanglements	47, 50	18, 19
Espionage, guarding against	58	22
Estimate of the situation	35–58	12
Feints, hostile forces	21	8
Field artillery. (*See* Artillery.)		
First defensive position	43	15
Fleet (*see* also Navy)	2	1
Fortifications, construction	8, 108	4, 36
General reserves (*see also* Reserves):		
Employment	25, 80	9, 29
Location	29, 41	10, 15
Geographical, climatic, and terrain features	35–37	12
GHQ tank units, employment	118	39
Ground, organization:		
Antitank gun emplacements	43	15
Antitank mine fields	48, 49	18
Automatic weapon emplacements	43	15
Barbed wire entanglements	47, 50	18, 19
Camouflage, use of	43	15
Demolitions and obstacles (*see also* Obstacles)	46	18
Antitank mine fields	48, 49	19
Barbed wire entanglements	47, 50	18, 19
Purpose	52	19
Underwater	50	19
Peacetime	44	18
Pill boxes, construction	43	15
Priorities in	43	15
Harbor channel area, definition	App.	40
Harbor defenses	6	3
Definition	App.	40
Railway artillery support	102	35
Hostile combat aviation	31, 73	11, 26
Hydrographic characteristics, water areas	36	12
Infantry	61, 76	23, 27
Information:		
Censorship and secrecy measures	57	21
False or misleading	24	9
From—		
Inshore and offshore patrols	3	1
Naval air and surface elements	79	28
Land areas	36	12
Outpost and covering force system	61	23

Information—Continued.	Paragraphs	Pages
Subsector commanders, furnished to	11	5
Transmission	3, 53, 71	1, 20, 26
Water areas	36	12
Weather and navigational aids	57	21
Initial positions, reserves	73	26
Inner harbor area	App.	40
Inshore patrol:		
Communication with patrol boats	70, 71	26
Composition	3	1
Definition	App.	40
Missions	3	1
Intelligence services:		
Agents	10	5
Antiaircraft artillery	54, 55, 114	21, 38
Definition	App.	40
Intelligence, transmission between headquarters	53, 71	20, 26
Intensified reconnaissance and preparation. (*See Defense,* stages.)		
Joint message centers	3	1
Joint training	20	8
Land areas	36	12
Land obstacles	20, 48, 108	8, 19, 36
Landing areas, characteristics	38	12
Landing attacks	23–26, 82–88	9, 29
Landing facilities, destruction	51, 108	19, 36
Liaison officers	3	1
Light artillery	106	36
Lighthouses	54, 57	21
Local sector:		
Definition	App.	40
Reserves	74	27
Meteorological conditions, analysis	35	12
Mine fields	48, 49, 61, 66, 94	19, 23, 25, 33
Mines	48, 108	19, 36
Minor operations, objectives	33	11
Mobile forces in coast defense	7–58	4
Mobile seacoast artillery. (*See* Artillery.)		
Motorized divisions, employment	119	39
Natural obstacles	48	19
Naval bases, definition	App.	40
Naval district, definition	App.	40
Naval local defense forces:		
Definition	App.	40
Employment	19	7
Navigation aids, denial to enemy	57	21
Navy:		
Aviation	3	1
Boat patrol groups (*see also* Boat patrols)	65–71	25
Coast Guard vessels	54	21
Coordination	5	2
Fleet	2	1
Frequencies and codes	3	1
Inshore patrols. (*See* Inshore patrols.)		

	Paragraphs	Pages
Navy—Continued.		
Joint training	20	8
Local defense forces	19, App.	7, 40
Missions	2, 3	1
Naval districts, definition	App.	40
Offshore patrols. (*See* Offshore patrols.)		
Signal communication centers	3	1
Night attacks, enemy	82	29
Obstacles	46–52	18
Anchored	50	19
Antitank mine fields:		
Construction	49	19
Location	48	19
Artificial	48	19
Barbed wire entanglements	47, 50	18, 19
Demolitions. (*See* Demolitions.)		
Engineers, construction	49, 108	19, 36
Entanglements	47, 50	18, 19
Land	20, 48, 108	8, 19, 36
Mine fields. (*See* Mine fields.)		
Natural	48	19
Preparation and construction	46–52	18
Underwater	43, 50, 66, 68	15, 19, 25
Offshore patrol	3, 54	1, 21
Definition	App.	40
Operations, enemy:		
Daylight attacks	82	29
During—		
Position in readiness stage of defense	18	7
Resistance stage of defense	21	8
Espionage	58	22
Night attacks	82	29
Sabotage	14, 58	6, 22
Organization of the ground. (*See* Ground, organization.)		
Organization of sectors, subsectors and local sectors	39	13
Outer harbor areas, definition	App.	40
Outposts:		
Armament	62, 63	24
Composition	61, 62	23, 24
Defense at the beach	63, 64	24, 25
Disposition	61	23
Missions	27, 61, 63	10, 23, 24
Reserves, support by	62, 74, 75	24, 27
Strength	62	24
Supports	61, 62	23, 24
Troops	63	24
Withdrawal	63	24
Outpost detachments	19	7
Overseas possessions, defense	34, 44	11, 18
Parachute troops. (*See* Troops transported by air.)		
Patrol boats (*see also* Boat patrols):		
Armament	65	25
Requisition from commercial and private sources	69	26
Signal communication	70	26

	Paragraphs	Pages
Patrol zone	66	25
Patrolling	67	25
Photographic missions, aviation	112, 113	38
Pill boxes, construction	43	15
Plans and preparations, use of mobile forces	35–58	12
Position in readiness. (*See* Defense, stages.)		
Priorities, defensive works	43	15
Radio:		
Beacons	57	21
Commercial and amateur stations	57	21
Communication, boat patrols	70	26
Detector, use	54	21
Interception and direction finding	53	20
Restrictions on use	53, 57	20, 21
Weather forecasts	57	21
Raids	14	6
Railroads, use	45, 100	18, 34
Reconnaissance	10–16	5
Air	13, 53	6, 20
Beach	13, 16	6, 7
Commanders:		
Sector and subsector	12, 13	5, 6
Unit	16, 20	7, 8
During peace	8	4
Enemy	18	7
Engineers, employment	108	36
Long-range	54	21
Photographic	112, 113	38
Sea	13	6
Reconnaissance aviation, employment	9, 54, 111	4, 21, 37
Requisition of commercial facilities	11, 12, 69	5, 26
Reserves	73–81	26
Artillery support	75	27
Echelons higher than sectors	77–80	28
General:		
Employment	25	9
Location	29	10
Initial positions	73	26
Local sector	74	27
Location	29, 62, 78	10, 24, 28
Motorized	28, 29, 73, 79	10, 26, 28
Movement	73, 79	26, 28
Naval forces, support	81	29
Plans and preparations for employment of	73	26
Protection from hostile aviation	73	26
Sector	28, 74, 76, 78, 79	10, 27, 28
Security against hostile aviation	73	26
Signal communication	80	29
Subsector	28, 75	10, 27
Support of outposts	74, 75	27
Resistance. (*See* Defense, stages.)		
Restrictions, signal communication	53, 57	20, 21
Roads and trails	45	18
Routes of communication	45	18
Sabotage, guarding against	14, 45, 58	6, 18, 22
Screens, offshore patrol	3	1

	Paragraphs	Pages
Second defensive position	43	15
Searchlights, employment	61, 104	23, 35
Secondary landings	21	8
Sectors:		
Allocation of mobile forces to	41	15
Commanders	6, 11, 12, 15, 39	3, 5, 6, 13
Definition	App.	40
Reserves	28, 74, 76, 78, 79	10, 27, 28
Security detachments	14	6
Signal communication:		
Air-air	53	20
Air-ground	53	20
Commercial facilities	12, 53	5, 20
Destruction, enemy installations	94	33
Joint message centers	3	1
Naval frequencies and codes	3	1
Observation posts	80	29
Outposts	19	7
Radio. (*See* Radio.)		
Reserves	80	29
Restrictions	53, 57	20, 21
Ship-to-shore and ship-to-snip	53	20
Subsector boat patrol groups	70, 80	26, 29
Visual signals	71	26
Wire circuits	53	20
Signal Corps, employment	53, 116	20, 39
Storm warning broadcasts	57	21
Submarine patrols	3	1
Subordinate commanders	23	9
Subsector:		
Boat patrol groups	65–71	25
Commanders:		
Allocation of mobile forces to	41	15
Control of harbor defenses	6	3
Information and instructions furnished	11	5
Missions	12, 13, 39	5, 6, 13
Personal reconnaissance	13	6
Organization of boat patrol groups	65	25
Conduct of forces in attack	82–88	29
Definition	App.	40
Outpost and advanced covering force	61–64	23
Reserves	28, 75	10, 27
Tanks, employment	45, 86, 118	18, 31, 39
Targets:		
Mobile seacoast artillery	94	33
Railway artillery	98	34
Temporary harbor defenses	6	3
Terrain	35–40	12
Territorial subdivisions	39	13
Traffic control	16, 73	7, 26
Training:		
Armed forces during peace	8	4
Field artillery units	90	32
Joint	20	8
War games and command post exercises	16	7
Transports, destruction of	5	2

	Paragraphs	Pages
Troops transported by air:		
Air landing	18, 21	7, 8
Civil defense agencies, employment	12	5
In minor attacks	33	11
Parachute troops	18, 21	7, 8
Plans for defense against	40	14
Preliminary attacks	14	6
Railroad movements, disruption by	45	18
Reserves, employment against	78	28
Underwater obstacles and entanglements	43, 50, 66, 68	15, 19, 25
Unit commanders	16, 20	7, 8
Unity of effort	5	2
Vessels, Coast Guard	54	21
Visual signals	71	26
War plans, revising	10	5
Water areas	6, 36	3, 12
Warning service, aircraft	54, App.	21, 40
Weather	37, 57	12, 21
Wire circuits	53	20